VPA PERMIT PROGRAM STATEMENT OF BASIS

This document gives pertinent information concerning the VPA permit listed below. This permit is being processed as a municipal facility. This permit includes land application of treated effluent from the Cooke Campsite sewage treatment plant (STP) located at Fort A.P. Hill in Caroline County.

1. Name and Address

Facility Name and Address:
Cooke Campsite STP
Fort A.P. Hill
Bowling Green, VA 22427

Legal Name of Owner and Address:
American Water O&M, Inc.
1025 Laurel Oak Road
Voorhees, NJ 08043

2. Location of Pollution Management Activity: 19952 North Range Road, Bowling Green, VA
County: Caroline SIC Code: 4952

3. Facility Contact: Name: Mr. James Sheridan
Title: Vice President
Telephone Number: 856-309-4871

4. Permit Drafted by:
Regional Office: NVRO
Permit Writer: Anna T. Westernik
Reviewed By: Tom Faha
Site Inspection: Anna T. Westernik Date: 3/7/01 (See **Attachment 1**)

5. Permit Characterization

Permit Type
( ) Land Application of Sludge
( ) Frequent
(x) Existing Facility ( ) Infrequent
( ) Proposed Facility (X) Land Application of Wastewater
( ) Other

Facility
(x) Municipal ( ) Intensified Animal Feeding Operation
( ) Industrial ( ) Other Animal Feeding Operation
( ) Concentrated Animal Feeding Operation
( ) Aquaculture

Permit Action
( ) Issuance ( ) Enforcement Action
(x) Reissuance ( ) Revoke and Reissue
( ) Modification

6. Statutory or Regulatory Basis for Special Conditions and Monitoring Requirements:
(X) State Water Control Law
(X) 9 VAC 25-32-10 et seq - VPA Permit Regulation
(X) Water Quality Standards (Surface and Groundwater Monitoring)
(X) Agency Guidance Manual
(X) Sewerage Regulations (SCATS)
( ) Additional

7. Licensed Operator Requirements. Class IV

8. Reliability Class. Class II Reliability

9. Application Information

Application Submitted by :	John E. Dumoulin, Jr., Lt. Col. U.S. Army Garrison, Fort A.P. Hill
Address :	Dept. of the Army Headquarters, U.S. Army Garrison, Fort A.P. Hill 18436 4th Street, Fort A.P. Hill, Virginia 22427-3114
Application Completed by :	Ali Woodworth, URS
Application Receipt Date :	12/27/00
Additional Information Requested :	2/15/01
Additional Information Received :	3/15/01
Application Complete Date :	3/22/01

10. Pollution Management Activity Description (See **Attachment 2**—Treatment Works Diagram)

This facility receives effluent via gravity from Cooke Campsite—a military training facility. Before entering the two aerated oxidation ponds, the effluent is pretreated by two grease traps. One is located at the mess hall and one is located at the headworks of the treatment plant. Septage and grease are pumped and hauled from these grease traps periodically.

The supernatant from the holding ponds (Latitude 38 ^{o} 09' 04", Longitude 77 ^{o} 11' 33) travels to a contact chamber where it is disinfected by gaseous chlorination. The chlorinated effluent in the contact chamber is transferred by booster pumps located in a heated building, is pumped through 2" piping to 20 sprinkler heads, and is land applied (**Attachment 3**). The spray field consists of two zones. Zone 1 will have 3 sprinklers capable of dispersing 33 gpm of sewage; Zone 2 will have 4 sprinklers capable of dispersing 44 gpm of sewage. The area covered by the sprinklers in these two zones is 0.6 and 0.8 acres, respectively. The total spray area is 2.6 acres. Approximately 75% of the soils in the spray field are Altavista sandy loam; the spray field is planted in orchard grass.

11. Location Description: Name of Topographic Map: 168B—Port Royal Quadrangle (**Attachment 4**)

The effluent spray irrigation field for Cooke Campsite STP is located approximately 300 meters from the sewage ponds and 50 meters from Custer Trail (Latitude 38 ^{o} 08' 55", Longitude 77 ^{o} 11' 47). There are no water intakes or significant discharges within a one-mile radius of the site.

12. Changes to the permit that occurred during the processing period, and rationale for these changes.

1. The hydraulic loading rate calculations have been modified so that they are based on design flow instead of actual flow. This is consistent with agency spray irrigation guidance.

2. The vertical permeability has been changed from the figures calculated when soil borings were collected 10 years ago to the permeability given for Altavista soils found in the Caroline County Soil Survey. This is consistent with agency spray irrigation guidance

3. This wastewater treatment system will be required to be Reliability Class II per the recommendation of the Virginia Department of Health.

4. A Class IV operator will be required per the recommendation of the Virginia Department of Health.

13. Basis for monitoring requirements. Included in Table I, Basis for Monitoring Requirements, are the source, rationale, or guidance used to establish the monitoring frequency, sample type, and limitations for the parameters that are required to be monitored in this permit.

The purpose of the monitoring requirements is to ensure that the spray irrigation site and hence the surface and groundwater do not receive excess nutrient loadings because of the effluent application. The purpose of the groundwater monitoring in the proximity of the storage ponds is to ensure that the effluent from the ponds is not seeping into the groundwater.

TABLE 1—BASIS FOR MONITORING REQUIREMENTS SIC CODES 4952

These monitoring requirements and limitations are effective during the period from the date of the permit issuance date and lasting until the permit's expiration date

MONITORING POINT	PARAMETER	UNITS	LIMITATIONS	FREQUENCY	TYPE	BASIS
Storage Pond (1)	Flow	MGD	NL	Continuous	Recorded	BPJ/SCATS
	BOD_5	ppm	60 Max.	1/Month	Composite[a,c]	BPJ/SCATS
	Total Suspended Solids	ppm	60 Max.	1/Month	Composite[c]	BPJ/VPA
	Fecal Coliform	N/100 ml	NL	1/Month	Grab	BPJ/SCATS
	Total Residual Chlorine	ppm	2.0 Min.	1/Day	Grab	BPJ/SCATS
	Oil and Grease	ppm	NL	1/Month	Grab	BPJ
	Volume in Storage	MG	NL	1/Month	Calculated	BPJ/VPA
	Lagoon Freeboard	ft.	2 ft. min.	1/Month	Measured	BPJ/SCATS
	Irrigation Rate	IN/H, D, W	0.25, 1, 2,Varies	1/Day	Calculated[a]	BPJ/SCATS
	Total Volume to Site	gal/acre/month	[a]	1/Month	Calculated	BPJ/VPA
	pH	S.U.	6.0-9.0	1/Day	Grab	BPJ/VPA
	Alkalinity as $CaCO_3$	ppm	NL	1/Month	Composite[c]	BPJ/VPA
	Conductivity	NL	mmho/cm	1/Month	Grab	BPJ
	Plant Available Nitrogen[b]	lb/acre	[b]	1/Month	Calculated	BPJ/SCATS
	Ammonia-N	ppm	NL	1/Month	Composite[c]	BPJ/VPA
	Nitrate N	ppm	NL	1/Month	Composite[c]	BPJ/VPA
	Total Kjeldahl N	ppm	NL	1/Month	Composite[c]	BPJ/VPA
	Total Phosphorus	ppm	NL	1/Month	Composite[c]	BPJ/VPA
	Total Potassium	ppm	NL	1/Month	Composite[c]	BPJ/VPA
	Chlorides	ppm	NL	1/Month	Composite[c]	BPJ
	Total Sodium	ppm	NL	1/Month	Composite[c]	BPJ
	Total Calcium	ppm	NL	1/Month	Composite	BPJ
	Total Magnesium	ppm	NL	1/Month	Composite	BPJ
	Total Boron	ppm	NL	1/Month	Composite[c]	BPJ
	Dissolved Cadmium	ppm	NL	1/Year	Composite[c]	BPJ/VPA
	Dissolved Chromium	ppm	NL	1/Year	Composite[c]	BPJ/VPA
	Dissolved Copper	ppm	NL	1/Year	Composite[c]	BPJ/VPA
	Dissolved Lead	ppm	NL	1/Year	Composite[c]	BPJ/VPA
	Dissolved Mercury	ppm	NL	1/Year	Composite[c]	BPJ
	Dissolved Nickel	ppm	NL	1/Year	Composite[c]	BPJ/VPA
	Dissolved Zinc	ppm	NL	1/Year	Composite[c]	BPJ/VPA
	Sodium Adsorption Ratio (SAR)	NA	NL	1/Month	Calculated	BPJ

MONITORING POINT	PARAMETER	UNITS	LIMITATIONS	FREQUENCY	TYPE	BASIS
Soil (2)						
	Available Phosphorus	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Cation Exchange Capacity	meq/100 g	NL	1/Year	Composite[d]	BPJ/VPA
	Exchangeable Calcium	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Exchangeable Magnesium	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Exchangeable Potassium	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Exchangeable Sodium	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Exchangeable Sulfur	ppm	NL	1/Year	Composite[d]	BPJ
	Ammonia Nitrogen	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Organic Nitrogen	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Total Nitrogen	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Soil Organic Matter	Percent	NL	1/Year	Composite[d]	BPJ/VPA
	Base Saturation	Percent	NL	1/Year	Calculated	BPJ
	Exchangeable Sodium Percentage (ESP)	Percent	NL	1/Year	Calculated	BPJ
	Soil pH	S.U.	NL	1/Year	Composite[d]	BPJ/VPA
	Hydraulic Conductivity	In/Hour	NL	1/Year	Per O&M	BPJ/VPA
	Total Cadmium	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Total Chromium	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Total Copper	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Total Lead	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Total Manganese	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Total Mercury	ppm	NL	1/Year	Composite[d]	BPJ
	Total Nickel	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Total Zinc	ppm	NL	1/Year	Composite[d]	BPJ/VPA
	Particle Size or Texture	Percent	NL	1/Year	Per O&M	BPJ/VPA
Groundwater (3)	Chlorides	ppm	NL	1/Quarter	Grab	BPJ/VPA
	Specific Conductivity	Φmhos/cm	NL	1/Quarter	Grab	BPJ/VPA
	Nitrate-Nitrogen	ppm	NL	1/Quarter	Grab	BPJ/VPA
	Fecal Coliform	N/100 ml	NL	1/Quarter	Grab	BPJ/VPA
	Total Coliform	N/100 ml	NL	1/Quarter	Grab	BPJ/VPA
	Static Water Level	ft/inches	NL	1/Quarter	Measured	BPJ/VPA
	pH	S.U.	NL	1/Quarter	Grab	BPJ/VPA
	Alkalinity (as $CaC0_3$)	ppm	NL	1/Quarter	Grab	BPJ/VPA
	Ammonia-N	ppm	NL	1/Quarter	Grab	BPJ/VPA
	Hardness (as $CaC0_3$)	ppm	NL	1/Quarter	Grab	BPJ/VPA
	Total Phosphorus	ppm	NL	1/Quarter	Grab	BPJ/VPA

MONITORING POINT	PARAMETER	UNITS	LIMITATIONS	FREQUENCY	TYPE	BASIS
	Total Kjeldahl Nitrogen	ppm	NL	1/Quarter	Grab	BPJ/VPA
	Total Organic Carbon	ppm	NL	1/Quarter	Grab	BPJ/VPA
	Total Sodium	ppm	NL	1/Quarter	Grab	BPJ/VPA
	Total Boron	Φg/l	NL	1/Quarter	Grab	BPJ/VPA
	Total Cadmium	Φg/l	NL	1/Quarter	Grab	BPJ/VPA
	Total Chromium	Φg/l	NL	1/Quarter	Grab	BPJ/VPA
	Total Copper	Φg/l	NL	1/Quarter	Grab	BPJ/VPA
	Total Lead	Φg/l	NL	1/Quarter	Grab	BPJ/VPA
	Total Mercury	Φg/l	NL	1/Quarter	Grab	BPJ
	Total Nickel	Φg/l	NL	1/Quarter	Grab	BPJ/VPA
	Total Zinc	Φg/l	NL	1/Quarter	Grab	BPJ/VPA

Legend:
BPJ - Best Professional Judgement
SCATS - 1994 Proposed SCAT Regulations
VPA - 6/92 VPA Permit Manual

a = Maximum volumes specified in O&M Manual
b = Limited by grass PAN requirement
c = A representative composite sample shall be comprised of at least four volume average of weight average grab samples collected over a daily operating period
d = Soil samples shall be a composite of various locations in the spray fields and taken in accordance with the O&M Manual

(1) Effluent from storage pond following chlorination
(2) Land application site as established in O&M Manual
(3) Monitoring wells established in Groundwater Monitoring Plan

14. Special Conditions

A. Permit Section Part 1.B. The Total Residual Chlorine (TRC) limitations are established to ensure adequate disinfection of the treated sewage effluent. The Virginia Department of Health (VDH) and the Department of Environmental Quality (DEQ) have jointly adopted a policy to allow 10% of the required samples after the chlorine contact tank and before dechlorination to be below 2.0 mg/l. However, no TRC result is to be lower than 0.6 mg/l so as to ensure constant disinfection.

Draft VDH Sewage Collection and Treatment Regulations (12 VAC 5-581-940E.1)

B. General Special Conditions

1. Prohibition of Point Source Discharge -- There shall be no discharge of pollutants to surface waters from this operation except in the case of a storm event greater than a 25-year, 24-hour storm.

[State Water Control Board's VPA Permit Regulation (9 VAC 25-32-30.A)]

2. Indirect Dischargers -- Sewage treatment plants shall provide adequate notice to DEQ of any substantial change in the quantity or quality of pollutants being introduced into the treatment works and any anticipated impact the change may have on such treatment works. This special condition applies to all sewage treatment plants both publicly or privately owned.

[State Water Control Board's VPA Permit Regulation (9 VAC 25-32-90.B)]

3. 95% Capacity Reopener -- The permit contains a requirement for the permittee to submit a plan of action for ensuring continued compliance with the terms of the permit when the monthly average effluent flow reaches 95% of the plant's design flow for each month of any three consecutive months. The permittee shall notify DEQ in writing within 30 days of this occurrence and submit the plan of action for ensuring continued compliance with the terms of the VPA permit no later than 90 days from the third consecutive month.

The plan of action shall include the necessary steps and a prompt schedule of implementation for controlling any current problem or any problem that could reasonably be anticipated as the result of high influent flows.

[State Water Control Board's VPA Permit Regulation (9 VAC 25-32-90.B)]

4. Licensed Operator Requirements -- A Class IV licensed wastewater operator is required at this facility. 9 VAC 25-32-190 of the VPA Permit Regulation requires the permittee to employ or contract at least one operator who holds a current wastewater license appropriate for the permitted facility in accordance with the regulations of the Board for Certification of Water and Wastewater Works Operators. The Department of Professional & Occupational Regulation (Board of Waterworks and Wastewater Works Operators) issues licenses to wastewater treatment operators.

Virginia Pollution Abatement (VPA) Permit Regulation (9 VAC 25-32-30.B), BPJ

5. Materials Handling/Storage -- Materials and waste products are to be stored in such a manner as to prevent their discharge to state waters.

[Virginia Pollution Abatement (VPA) Permit Regulation (9 VAC 25-32-30.B)]

6. Operations and Maintenance Manual Requirement – The permittee shall maintain a manual for the treatment works permitted herein. This manual shall reflect the practices and procedures, including Best Management Practices, followed by the permittee to ensure compliance with the permit. Deviations from the approved manual affecting required minimal elements (influent and effluent sampling, operational testing, staffing) must be approved before the changes are made. An updated O&M Manual shall be submitted for staff approval within one year of the permit's approval date. Upon approval, the revised Operations and Maintenance manual will become an enforceable part of the permit.

The minimal following topics must be included in the manual:

a. A description of the wastewater treatment plant processes.

b. A description of the spray irrigation system that includes the application rate and maintenance of the spray irrigation system.

c. Maintenance practices for the turf grass cover and the soils, and a description of the grasses and soils.

d. A plan for management and disposal of solids or sludge generated by the wastewater treatment facility.

e. Testing requirements and procedures that include effluent, groundwater and soil sample collection, handling; preservation; and methods of chemical analyses. Groundwater and soil sampling locations must be included in this section.

f. Record-keeping and reporting requirements.

g. A list of the chemicals and materials in storage areas.

h. Responsible officials, their duties, and their roles.

i. A plan to remedy acute, short-term failures to provide treatment.

[1977 Sewage Regulations]

7. Effluent Application Sites -- Effluent shall be applied only to the 2.6 acre site identified in the December 20, 2000 permit application. The hydraulic loading rate calculations state that 117 inches of wastewater can be applied to the 2.6 acre site in a year's period (**Attachment 5**).

   [DEQ Guidance Memo 01-2005, 1981 EPA Process Design Manual for Land Treatment of Municipal Wastewater]

8. Effluent Application Rates -- Effluent shall not be applied at rates that exceed 0.25 in/hr, 1 in/day, 2 in/week, or the monthly maximum loading rates shown in **Attachment 5**.

   [Draft VDH Sewage Collection and Treatment Regulations (12 VAC 5-581-940F.9), DEQ Guidance Memo 01-2005, BPJ]

9. Operational Limitations -- Operational limitations during periods of inclement weather are:

   a. Effluent shall not be applied when the ground is saturated (>90% of field capacity) or during periods of rainfall.

   b. Effluent shall not be applied to cultivated or bare ground covered with ice or snow.

   c. Effluent shall not be applied to frozen ground.

   d. The land application system shall be operated so that the diversion ditches do not convey wastewater from the site. This may involve reduction and/or cessation of land application during inclement weather.

   Violation of the operational limitations may result in DEQ requiring submittal of a soil moisture monitoring plan for this treatment facility.

   [Draft VDH Sewage Collection and Treatment Regulations (12 VAC 5-581-940E.1)]

10. Sludge Management Plan and Reopener -- The permittee shall conduct all sewage sludge use or disposal activities in accordance with a Sludge Management Plan (SMP) approved by DEQ. The SMP is an enforceable part of the permit. The permit may be modified or alternatively revoked and reissued to incorporate limitations/conditions necessitated by substantial changes in sewage sludge use or disposal practices.

The limiting factor determining wastewater storage capacity of the lagoons is the accumulation of sludge in the lagoons. Within one year of the permit issuance date, the permittee shall submit an amendment to the sludge management plan submitted with this permit and the sludge management plan received by this agency on June 8, 1998 that includes the following minimal information:

a. The expected life expectancy of the lagoons.

b. A proposal for solids disposal if necessary (e.g., construction of drying beds).

c. A schedule for measuring and reporting to DEQ the distances between the tops of the water levels in the lagoons and the tops of the sludge layers in the lagoons.

d. Methods for achieving adequate vector attraction, adequate pathogen reduction, and pollutant limitations if the sludge is land applied.

[State Water Control Board's VPA Permit Regulation (9 VAC 25-32-100.E)]

11. Groundwater Monitoring Plan -- The permittee shall prepare a groundwater monitoring plan to encompass the effluent lagoon and the spray field at the Cooke Campsite STP and submit it to DEQ within one year of the permit effective date. Upon approval, the groundwater-monitoring plan shall become an enforceable part of the permit.

The groundwater monitoring plan shall detail the number, type and locations of the present monitoring wells; compile the groundwater sampling data, and explain the groundwater sampling protocols. Groundwater monitoring parameters during this permit cycle will be those indicated in Part I.A.3, Groundwater Monitoring. If groundwater monitoring shows a significant increase in pollutant concentrations, a corrective plan that contains procedures to eliminate and contain the plume must be submitted to the Department of Environmental Quality, Northern Virginia Regional Office (DEQ, NVRO) within 60 days of permittee notification by the regional office. A risk analysis may be required. The corrective action plan will be incorporated into the groundwater monitoring plan and hence, will become an enforceable part of the permit.

There are presently numerous rodent and groundhog burrows in the vicinity of the pond berms and in the spray fields. Burrowing rodents in the pond area may cause leakage. Burrows in the field will disturb the soil structure and hence, the attentuation ability of the soil. In addition, the burrows in the spray field may create a direct conduit to the monitoring wells and hence, false results will be derived from monitoring well analysis. Due to the existing problem with rodents and groundhogs, the groundwater-monitoring plan must also include an aggressive rodent and groundhog control strategy that includes a program for filling existing holes with appropriate backfill.

[Draft VDH Sewage Collection and Treatment Regulations (12 VAC 5-581-940G.4), BPJ]

12. Certificate to Operate and Certificate to Construct Requirements -- The permit requires that the permittee obtain a Certificate to Construct (CTC) and a Certificate to Operate (CTO) before constructing and operating wastewater treatment facilities, respectively.

[1977 Sewage Regulations (9 VAC 25-60-120)]

13. PAN Requirements – The annual PAN application rate for the spray site cannot exceed the maximum annual recommended nitrogen application of 250 pounds/acre/year for orchardgrass as stated in the Department of Conservation and Recreation, Virginia Nutrient Management Standards and Criteria (**Attachment 6**). If the crop grown on the spray site is changed, updated PAN application rate information and nitrogen fertilizer recommendations must be submitted to DEQ, NVRO for approval within 90 days of the change.

[BPJ, Virginia Nutrient Management Standards and Criteria]]

14. Freeboard Requirements -- The permittee shall maintain a minimum freeboard of two feet at all times in the effluent storage pond. Should the two-foot freeboard requirement be violated, the permittee shall immediately notify DEQ, NVRO describing the problem and measures to be taken to correct the problem. Within five days of the notification, the permittee shall submit a written statement of explanation and corrective measures.

[6/92 VPA Procedures Manual]

15. Monthly Summary Reports --A summary report of the previous month's activities shall be submitted to DEQ, NVRO by the 10th day of the following month. Reports shall include:

    a. Analyses of composite samples of sewage effluent in accordance with Parts I.A.1. that was land applied during the previous month.

    b. Results of soils and groundwater monitoring in accordance with Parts I A.2. and I.A.3. of the permit.

    c. Land application site information describing the effluent applied to each field during the previous month.

    d. A summary of the quantities of wastewater stored in and/or withdrawn from storage facilities and the remaining storage capacity.

    e. A gauge readings from the storage ponds demonstrating freeboard maintenance.

    f. A summary of spray head utilization demonstrating compliance with hydraulic loading rates listed in Part I.A.1 of the permit and the O&M manual.

    Each monthly VPA permit monitoring report must demonstrate that the land application site is not being hydraulically overloaded, the total amount of nitrogen being land applied is not exceeding the yearly nitrogen requirement of the crop, and that the land application is not impacting state waters. Using the results of at least the last 12 months of wastewater samples, PAN shall be calculated using the following formula:

    $PAN = (TKN - NH_3) + (0.50\ NH_3) + (N0_3 + N0_2)$

    If any of these conditions are being violated, the permittee must submit plans to expand the existing spray field or initiate other corrective action within 90 days after notifying DEQ, NVRO.

    After three years (or 36 monthly reports) the frequency of summary reports may be reduced to quarterly at the request of the permittee and the approval of DEQ.

    [6/92 VPA Procedures Manual, BPJ]

16. Annual Project Summary Reports -- An annual project summary report that includes the following shall be prepared and submitted by the 10th of February of each year to DEQ, NVRO:

    a. A summary of wastewater, soil monitoring, and groundwater analyses.

    b. A yearly water balance showing such items as inputs and drawdowns from storage facilities.

    c. Land application site information describing and quantifying the effluent applied to each field during the previous year that includes the annual and cumulative loads of limiting constituents (i.e., nitrogen and metals) and the remaining application site life.

    g. A summary of the turf management practices that occurred during the preceding growing season (the quantity of hay in pounds or tons/acre removed from the site, the type and quantity of lime and fertilizer additions made, and reseeding that occurred).

    e. A general statement of past system performance and the status of the permitted facility with regard to complying with VPA Permit requirements.

    [6/92 VPA Procedures Manual, BPJ]

17. Facility Closure Plan -- A facility closure plan shall be developed prior to termination of the pollutant management activities covered under this permit. The plan shall incorporate:

    a. The volume, percent solids, nutrient content, and other waste characterization information appropriate to the nature of the waste materials.

    b. A listing of all waste products at the facility along with a description of procedures for removal, land application, or other proper disposal of the wastes.

c. Closure plans for all waste treatment, storage, and handling facilities.

The facility closure plan shall be submitted to DEQ, Northern Regional Office, for review and approval prior to implementation of the plan.

[6/92 VPA Procedures Manual]

18. Slope Limitations – Irrigation of wastewater to new fields should occur only on land with a maximum slope of 5%. If it is necessary to irrigate areas with steeper slopes, special precautions shall be taken to prevent seepage or runoff from of sewage effluent to the surface water. Land application of wastewater cannot occur on slopes exceeding 12% grade.

[Draft VDH Sewage Collection and Treatment Regulations (12 VAC 5-581-940H)]

19. Soil Sampling and Analysis -- The soil pH of the spray site shall be adjusted to a minimum of 6.0 S.U. in accordance with the O&M manual before being placed in use each growing season.

[BPJ]

20. Crop Harvest – The permittee shall harvest hay grown on the land application sites as outlined in the approved O&M manual. Hay that has been harvested and baled shall not remain on site during or after the growing season.

[BPJ]

21. Irrigation Schedule -- An irrigation schedule shall be submitted to DEQ, Northern Virginia with the revised O&M manual within one year of the permit approval date. The schedule shall be based on the growing season for the selected grasses, crop water use, expected precipitation for the area, soil percolation, evapotransporation rates, and the facility maintenance schedule. Upon approval, this schedule shall become an enforceable part of the O&M manual. Irrigation of wastewater shall not occur between November 15 and March 15 of each year.

[BPJ]

22. Cation Imbalance Plan – A plan and schedule to correct possible cation imbalances resulting from irrigation shall be submitted to DEQ, NVRO with the revised O&M manual within one year of the permit approval date. Upon approval, the plan and schedule shall become an enforceable part of the O&M Manual.

a. Measuring Salinity: Salinity is measured in the effluent and soil by measuring both total sodium in ppm and conductivity in mmho/cm. The Virginia Polytechnic Institute (VPI) suggests that conductivity levels above 1 mmhos/cm can be detrimental to plant growth.

The best way to avoid salinity problems is to test the salt concentration of the irrigation water or electrical conductivity. Electrical conductivity is an indicator of the salt concentration based upon the ability of dissolved salts to increase the capability of water to conduct electricity. A concentration of 640 ppm total salts normally equates to an electrical conductivity of approximately 1 mmho/cm. This is considered "clean" water and can be applied indefinitely to crops having good salt tolerance. About 15 irrigations can be applied to crops having moderate salt tolerance and about 7 irrigations can be applied to crops having poor salt tolerance. An irrigation is defined as the amount of water required to provide plant available water through a crop's most active portion of the root zone (about 1-2 inches of water).

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Table I--Irrigation Recommendations with Water of Varying Sodium concentrations
(Virginia Polytechnic Institute)

Sodium Concentration (mg/)l	Electrical Conductivity (mmho/cm)	Good No.	Moderate No.	Poor No.
640	1	Indefinitely	15	7
1280	2	11	7	4
1920	3	7	5	2
2560	4	5	3	2
3200	5	4	2-3	1
3840	6	3	2	1
4480	7	2-3	1-2	--
5120	8	2	1	--

Crops following into each salt tolerance category include:
Good = bermuda grass, barley, cotton;
Moderate = rye, wheat, oats, sorghum, corn, alfalfa, tall fescue, orchard grass, vetch, and most vegetables;
Poor = soybean, clover, green beans and many tree fruit crops.

This table assumes that there is no intervening rainfall of sufficient intensity to cause leaching and that there is no salt accumulation in the soil at the start of the irrigation period.

b. Sodium Absorption Ratio (SAR): The ratio of the sodium concentration to the concentrations of calcium and magnesium in the wastewater shall be measured using SAR (Part I A.1 of the permit).

$$SAR = \frac{Na}{\sqrt{0.5(Ca + Mg)}}$$

c. Exchangeable Sodium Percentage: Possible excess sodium concentrations in the soil shall be measured using ESP, the percentage of the soil's cation exchange capacity occupied by the sodium cations.

$$ESP = \frac{Na \times 100}{CEC}$$

[BPJ]

23. Buffer Zones -- Buffer zones shall be maintained as follows:

a.	Distance from improved roadways	25 feet
b.	Distance from occupied dwellings	200 feet*
c.	Distance from water supply wells or springs	100 feet
d.	Distance from surface water courses	50 feet
e.	Distance from property lines .	100 feet*

f.	Distance from rock outcropping (with the exception of limestone outcrops)	25 feet
g.	Distance from limestone outcroppings[2]	50 feet

*Reductions that agreed to by adjoining property owner shall be in writing.

[OWRM Program Guidance Number 94-002]

24. Crop Selection -- Crops to be consumed by humans shall not be grown on the land application site.

[Draft VDH Sewage Collection and Treatment Regulations (12 VAC 5-581-940G.6)]

25. Vegetative Cover -- The owner shall maintain a complete grass cover on the land application sites which are currently being used through liming, fertilization, reseeding, and weed control as necessary.

The permittee shall cut hay and remove it from the site at least annually.

[Draft VDH Sewage Collection and Treatment Regulations (12 VAC 5-581-940G.5)]

26. Human and Livestock Access -- The spray area shall be adequately enclosed with suitable fencing and posted to prevent livestock and human access. Dairy animals shall not be allowed on the spray site within 60 days following wastewater application and beef cows shall not be allowed on the spray site within 30 days following wastewater application. Green chopped forage shall not be fed to the dairy animals if it is removed within 60 days following wastewater application and shall not be fed to beef cows if it is removed within 30 days following wastewater application.

[Draft VDH Sewage Collection and Treatment Regulations (12 VAC 5-581-940G.3), BPJ]

27. Berm Maintenance -- The permittee shall properly maintain all wastewater lagoon berms by mowing and removing grass on a regular basis, prohibiting tree establishment, and exterminating or removing burrowing animals from the berms.

[OWRM Program Guidance Number 94-002, BPJ]

28. Report Certification -- All monitoring reports submitted to DEQ shall include a signed VPA monitoring Report Certification (Attachment A of the permit).

[State Water Control Board's VPA Permit Regulation (9 VAC 25-32-70.C)]

29. Reliability Class –This wastewater treatment system will be required to be Reliability Class II. A compliance schedule for achieving Reliability Class II at this facility is included in this permit. Within 120 days of permit issuance, a schedule must be submitted to DEQ stating how Reliability Class II will be achieved. Reliability Class II status must be met within one year of permit issuance.

[Draft VDH Sewage Collection and Treatment Regulations (12 VAC 5-581-120)]

.15. Comments

A. Public Notice Information (**Attachment 7)**
Comment period begins: May 11, 2001 Comment period ends: June 11, 2001

Persons may comment in writing or by e-mail to the DEQ on the proposed reissuance of the permit within 30 days from the date of the first notice. Address all comments to the contact person listed below. Written or e-mail comments shall include the name, address, and telephone number of the writer and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The Director of DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing, and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action.

All pertinent information is on file and may be inspected, and copied by contacting Anna T. Westernik at the Northern Virginia DEQ Regional Office**,** 13901 Crown Court, Woodbridge, VA 22193; 703-583-3837, e-mail atwesterni@deq.state.va.us.

Following the comment period, the Board will make a determination regarding the proposed reissuance. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be given.

B. This wastewater treatment facility currently applies wastewater to the spray fields approximately 184 days per year. Discharge begins in April and ends in October. Discharge does not occur in September due to the harvesting of hay from the spray field. The frequency of discharge is two to three days per week. This infrequent level of discharge will result in an application amount that is far below design capacity of the wastewater treatment system.

An irrigation schedule will be required to be submitted with this permit within one year of the permit's effective date. This irrigation schedule should reflect the current level of wastewater application. If the land application requirements change in the 10-year permit period, the applicant may submit an updated O&M manual to DEQ along with the revised irrigation schedule. When the revised O&M manual is approved, the irrigation schedule changes can be incorporated into the new O&M manual and become an enforceable part of the permit.

Attachments

Attachment 1	Site Inspection
Attachment 2	Diagram of Cooke Campsite Sewage Treatment Plant
Attachment 3	Cooke Campsite Sewage Treatment Plant Layout Showing Location of Spray Field Application Site
Attachment 4	Topographic Map Showing Location of Sewage Storage Ponds and Spray Field Application Site
Attachment 5	Hydraulic Loading Rate Calculations
Attachment 6	Excerpt from the Department of Conservation and Recreation, Virginia Nutrient Management Standards and Critieria
Attachment 7	Public Notice

Attachment 1

March 14, 2001
MEMORANDUM

To: File

From: Anna Westernik, Permit Writer

Subject: March 7, 2001 permit inspection of the Cooke Campsite located at Ft. A.P. Hill

An inspection of the Cooke Campsite was conducted on March 7, 2001 for the purpose of reissuing the VPA permit. Persons in attendance during the inspection were Terry Banks and Paul Gaucher of Ft. A.P. Hill and Ali Woodworth of URS.

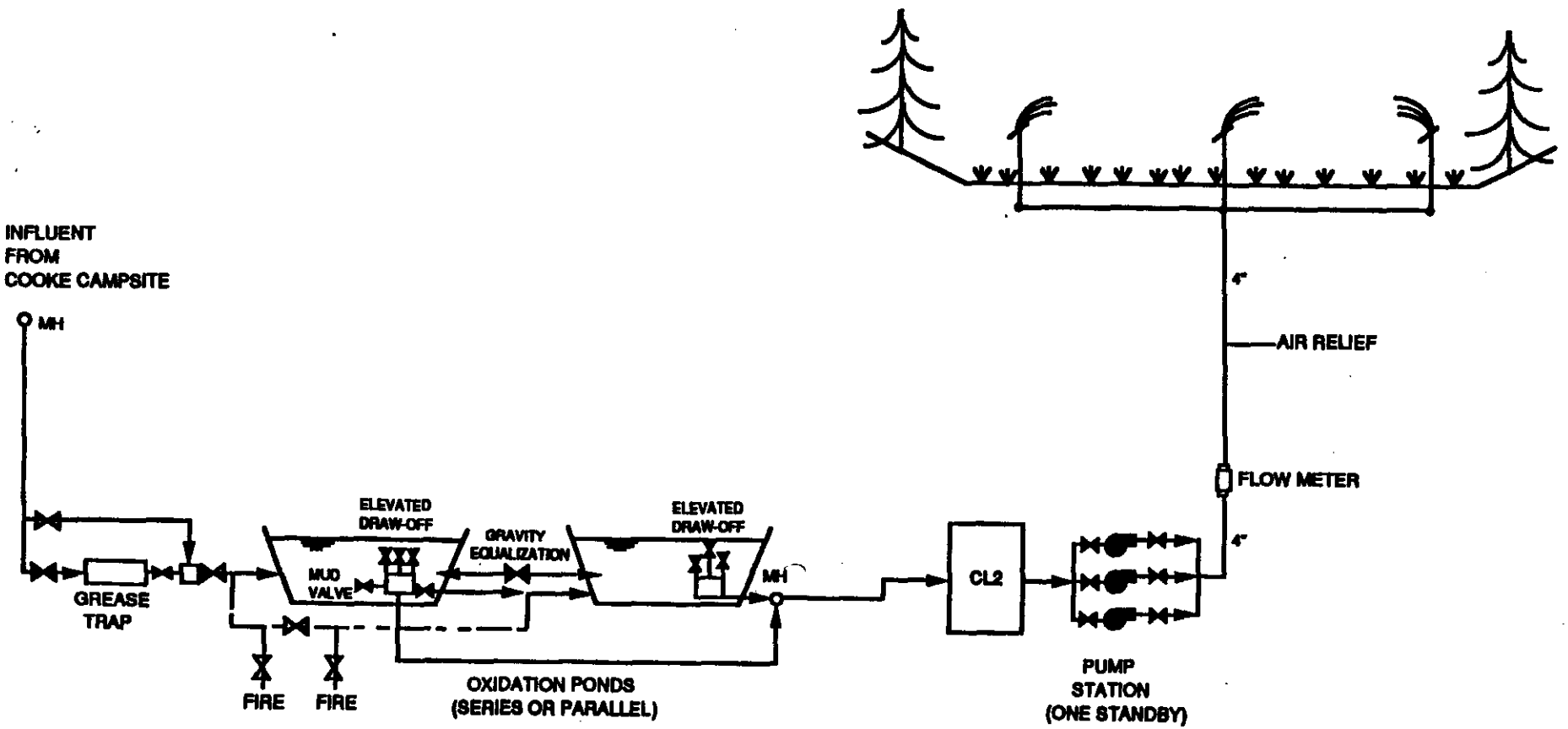
All influent treated at this facility originates from the Cooke Campsite. Cooke Campsite consists of a series of barracks, a shower/latrine facility, a mess hall, and an administrative building.

Influent arrives at the headworks via gravity from Cooke Campsite. A grease trap has been installed at the mess hall and the headworks to allow floatable oils and grease to settle. The grease traps are pumped periodically by a contractor. Influent then enters two oxidation ponds that are connected by a pipe and usually operated in series. However, either pond may be valved off and removed from operation or both may operate in parallel. The influent lines discharge in the center of the ponds near the bottom and turn upward at a 90° angle. An aerator is usually present in each pond, but they were disabled on the day of the inspection.

Supernatant from the ponds enters a chlorine contact tank where it is disinfected by gaseous chlorination and detained. From there it is metered and drawn to 20 sprinkler heads located in the spray fields by two booster pumps operating simultaneously. Three transfer pumps and a meter are located in a small heated building near the chlorine contact tank. The field is sprayed for a 22-hour period three days a week by timers, however, manual operation of the spray system is possible. After spraying ceases, all effluent is drained back to the treatment facility to avoid freezing of the spray heads.

The spray field is located approximately ¼ mile from the ponds and is planted in orchard grass. Three groundwater monitoring wells are present in the spray field area. Hay is harvested two to three times per year and is used for erosion control.

The amount of sludge generated by the ponds is minimal. Therefore sludge disposal from the ponds has not occurred. The grease traps act to collect sludge in the same manner as a septic tank, therefore, sludge discharge to the ponds has been reduced.

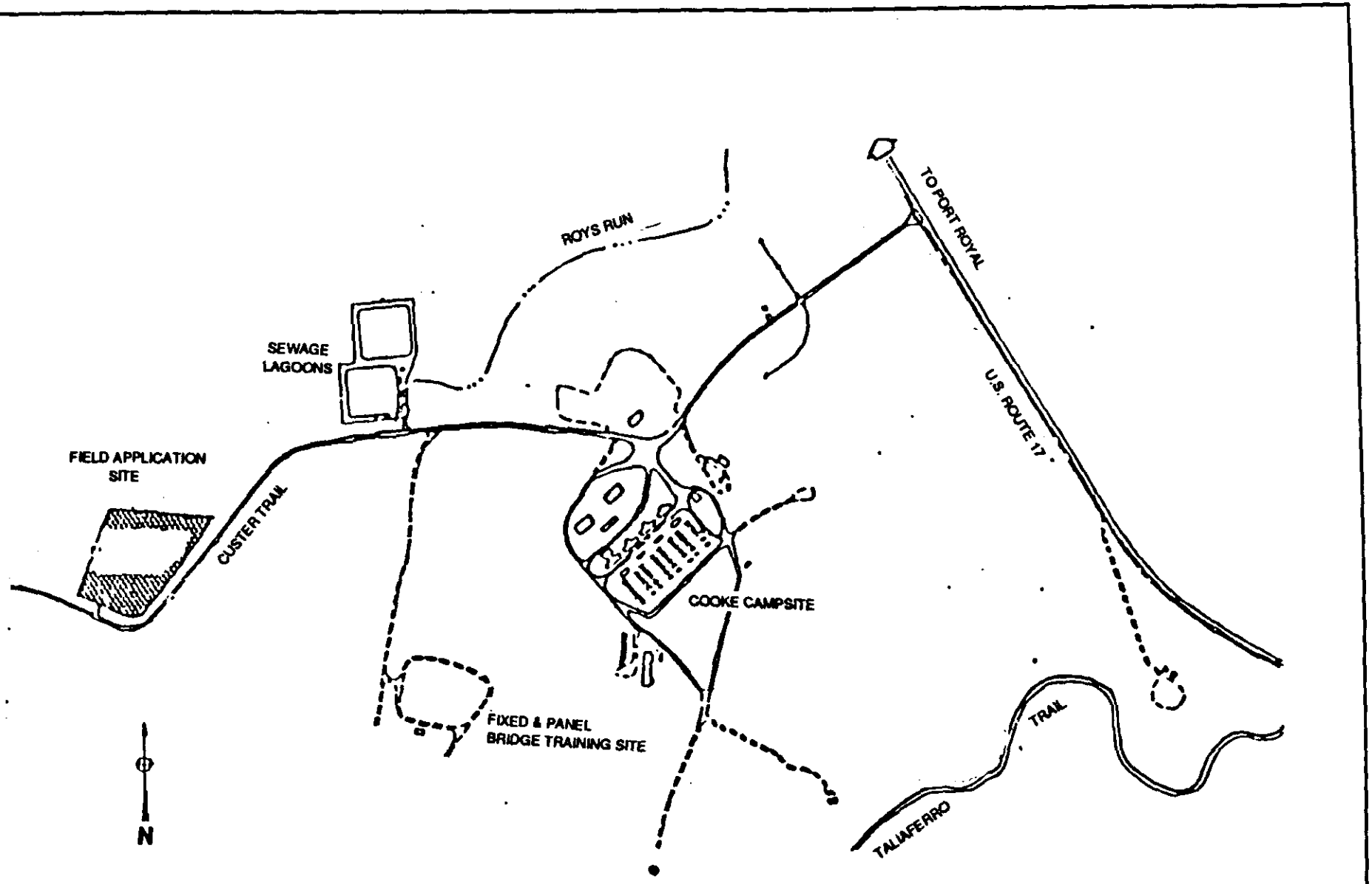


LEGEND

- STANDBY PUMP
- VALVE
- BYPASS LINE FOR PARALLEL OPERATION
- MANHOLE

Fort A.P. Hill – Bowling Green, Virginia	
Figure 1	Scale: No Scale
Cooke Campsite Wastewater Treatment System Flow Diagram	
Source: Cooke Campsite O&M Manual, Metcalf & Eddy, 1992	

URS Corporation
5540 Falmouth Street, Suite 201
Richmond, VA 23230



Metcalf & Eddy

FIGURE 1-1

COOKE CAMPSTIE SEWAGE TREATMENT PLANT SITE LAYOUT

Attachment 3

1000 ft Scale: 1 : 28,125 Detail: 12-7 Datum: WGS84

ADDENDUM
Attachment A

Estimate of Average Monthly and Seasonal Water Capacity of the Soil at the Cooke Campsite Spray Irrigation Field

	Evapo-transpiration (in/acre)[1]	Percolation (in/acre)[2]	Precipitation (in/acre)[3]	Available Capacity (in/acre)[4]	
April 15	2.11	4.32	3.13	3.30	
May	3.80	8.93	3.94	8.79	
Jun	5.23	8.64	3.77	10.10	
Jul	6.11	8.93	4.00	11.04	
Aug	5.46	8.93	3.97	10.42	
Sep	3.83	8.64	3.48	8.99	
Oct	2.04	8.93	3.66	7.31	
Nov 15	0.41	4.32	1.71	3.03	
	Annual available capacity			**62.97**	**in/acre**
				1,709,811	**gal/year/acre**
				4,445,507	**gal/year/2.6 acres**

[1] Evapotranspiration data from Virginia State Climatology Office ET data for Fredericksburg, the nearest station to Fort A.P. Hill.

[2] Percolation of 0.58 in/day (2% of the minimum permeability for Altavista soils (0.6-2.0 in/hour at 14-52 in. bgs))

[3] Mean precipitation values from the Corbin, VA station (Natural Resources Conservation Service website: ftp://162.79.124.23/support/climate/taps/va/51033.txt)

[4] Annual available capacity calculated using the hydrualic loading rate formula provided by A. Westernik of DEQ:

$L_w = ET - P_r + P_w$

where

L_w = wastewater hydraulic loading rate
ET = evapotranspiration rate
P_r = precipitation rate
P_w = percolation rate

Orchardgrass/Fescue (Tall Grass) Hay Production, Soil Productivity Groups I, II

Soil Test Level	Fertilizer Recommendations, Lb/A		
	N	P_2O_5	K_2O
L-	80-100*	120	240
L	80-100*	110	220
L+	80-100*	100	200
M-	80-100*	90	185
M	80-100*	80	170
M+	80-100*	70	160
H-	80-100*	60	145
H	80-100*	50	90
H+	80-100*	40	40
VH	80-100*	0	0

* The N recommendation is for a March application. If additional hay production is needed, apply 80 lbs N/acre after each cutting. Do not apply more than 250 lbs/acre per year. Organic nutrient sources may be applied in one or more applications. If applied after 10/1, split the application into a fall and spring application at 50% of total rate.

Orchardgrass/Fescue (Tall Grass) Hay Production, Soil Productivity Groups III, IV

Soil Test Level	Fertilizer Recommendations, Lb/A		
	N	P_2O_5	K_2O
L-	60-80*	90	145
L	60-80*	80	130
L+	60-80*	70	120
M-	60-80*	60	110
M	60-80*	50	95
M+	60-80*	40	85
H-	60-80*	40	70
H	60-80*	40	55
H+	60-80*	40	40
VH	60-80*	0	0

* N recommendation is for a March application. For additional fall hay production apply 60-80 lbs N/acre in late August/early September. Do not apply more than 160 lbs N/acre/year. Organic nutrient sources may be applied in one or more applications. If applied after10/1, split the application into a fall and spring application at 50% of total rate.

PUBLIC NOTICE
REISSUANCE OF A VIRGINIA POLLUTION ABATEMENT PERMIT (VPA)
AND STATE CERTIFICATION UNDER THE STATE WATER CONTROL LAW

First Public Notice Issue Date: May 11, 2001

The State Water Control Board has under consideration reissuance of the following Permit and State Certificate:

Permit No.:	VPA00008
Name of Permittee:	Department of the Army—Fort A.P. Hill
Facility Name:	Cooke Campsite
Facility Location:	Ft. A.P. Hill, Bowling Green, VA 22427
County:	Caroline
Permittee Address:	19952 North Range Road. Bowling Green, VA 22427

The proposed reissuance regulates land application of municipal effluent from Cooke Campsite, a military training facility located at Ft. A.P. Hill. 16,800 gallons of domestic wastewater will be treated daily and stored in two ponds before it is land applied on a 2.6 acre spray field.

This proposed reissuance is tentative. On the basis of preliminary review and application of lawful standards and regulations, the State Water Control Board proposes to reissue the permit subject to certain conditions.

The proposed reissuance consists of establishing limits and monitoring for the following parameters.

Effluent Limitations/Monitoring Requirements:
Limits for BOD_5 (60 mg/l maximum), TSS (60 mg/l maximum), Total Residual Chlorine (2 mg/l minimum), Lagoon Freeboard (2 ft. minimum), Irrigation Rate (.25 in/hr, 1 in/day, 2 in/week), Total Volume Applied to Site, pH (6.0 - 9.0 S.U.), PAN (250 lb/acre/year),

Monitoring for Flow, Fecal Coliform, Oil and Grease, Volume in Storage, Alkalinity, $CaC0_3$ Equivalence, Conductivity, Nutrients, Chlorides, Sodium, Metals, Sodium Absorption Ratio

Soil Monitoring:
Monitoring for Nutrients, Cation Exchange Capacity, Soil Organic Matter, Base Saturation, Exchangeable Sodium Percentage, pH, Hydraulic Conductivity, Metals, Particle Size

Groundwater Monitoring:
Monitoring for Chlorides, Specific Conductivity, Nutrients, Total and Fecal Coliform, Static Water Level, pH, Alkalinity, Hardness, Sodium, Metals

All pertinent information is on file and may be inspected, and arrangements made for copying by contacting Anna T. Westernik at the Virginia DEQ Northern Virginia Regional Office, 13901 Crown Court, Woodbridge, VA 22193-1453, Telephone: (703)583-3837, e-mail: atwesteri@deq.state.va.us.

Persons may comment in writing or by e-mail to the DEQ on the proposed reissuance of the permit and may request a public hearing within 30 days from the date of the first notice. Address comments to the contact person listed above. Written or e-mail comments shall include the name, address, and telephone number of the writer, and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. DEQ may decide to hold a public hearing if public response is significant. Requests for public hearings shall state the reason why a hearing is requested, the nature of the issues proposed to be raised in the public hearing and a brief explanation of how the requester's interests would be directly and adversely affected by the proposed permit action.

Following the comment period, the Board will make a determination regarding the proposed reissuance. This determination will become effective unless the DEQ grants a public hearing. Due notice of any public hearing will be given.